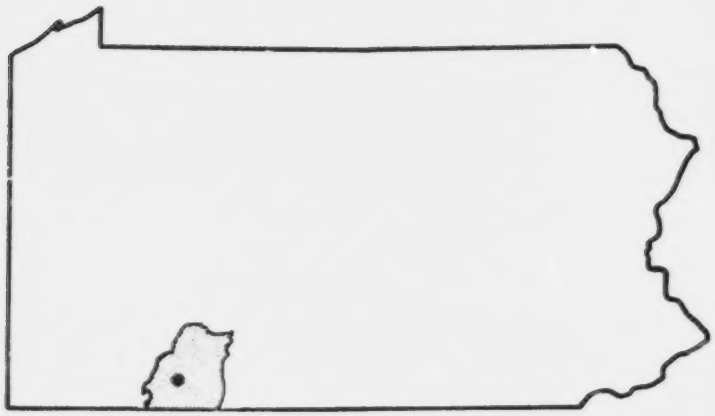
MAR 9 1990

FLOOD INSURANCE STUDY

TOWNSHIP OF SOMERSET, PENNSYLVANIA
SOMERSET COUNTY



MAY 17, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 422056

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: May 17, 1990

Flood Insurance Study Revised:

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Authority and Acknowledgments	1
	1.3 Coordination	1
2.0	AREA STUDIED	1
	2.1 Scope of Study	1
	2.2 Community Description	2
	2.3 Principal Flood Problems	2
	2.4 Flood Protection Measures	2
3.0	ENGINEERING METHODS	2
	3.1 Hydrologic Analyses	4
	3.2 Hydraulic Analyses	5
4.0	FLOODPLAIN MANAGEMENT APPLICATIONS	6
	4.1 Floodplain Boundaries	6
	4.2 Floodways	6
5.0	INSURANCE APPLICATIONS	7
6.0	FLOOD INSURANCE RATE MAP	9
7.0	OTHER STUDIES	9
8.0	LOCATION OF DATA	9
9.0	BIBLIOGRAPHY AND REFERENCES	10

FIGURES

Figure 1 - Vicinity Map 3

Figure 2 - Floodway Schematic 7

TABLES

Table 1 - Summary of Discharges 4

EXHIBITS

Exhibit 1 - Flood Profiles

East Branch Coxes Creek	Panels 01P -	02P
Unnamed Tributary to East Branch Coxes Creek	Panel	03P
Parson Run	Panel	04P

Exhibit 2 - Flood Insurance Rate Map Index and Street Index
Flood Insurance Rate Map

Exhibit 3 - Elevation Reference Marks

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Somerset, Somerset County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 8. This work was completed in May 1987.

1.3 Coordination

On December 13, 1984, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the township, and the USGS (the study contractor) to determine the streams to be studied by detailed methods.

On May 17, 1989, a final CCO meeting was held with representatives of FEMA, the township, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Somerset, Somerset County, Pennsylvania. The Borough of

Somerset is located within the Township of Somerset, but is not included in this study. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: East Branch Coxes Creek, from a point approximately 1,250 feet downstream of the confluence of Kimberly Run to the downstream corporate limits of the Borough of Somerset, and from the upstream corporate limits of the Borough of Somerset to the tailwater of the dam at Lake Somerset; Unnamed Tributary to East Branch Coxes Creek, from its confluence with East Branch Coxes Creek to the downstream corporate limits; and Parson Run, from its confluence with East Branch Coxes Creek to the downstream corporate limits. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through May 1992.

West Branch Coxes Creek, Wells Creek, Kimberly Run, and Middle Creek; and the remaining portions of East Branch Coxes Creek and Unnamed Tributary to East Branch Coxes Creek were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Township of Somerset.

2.2 Community Description

The Township of Somerset is located in the central portion of Somerset County in southwest Pennsylvania, approximately 25 miles south of Johnstown. It is bordered by the Township of Quemahoning to the north, the Township of Stonycreek to the east, the Township of Brothers Valley to the southeast, the Township of Black to the south, the Township of Milford to the southwest, the Township of Jefferson to the west, and the Township of Lincoln to the northwest.

2.3 Principal Flood Problems

Major floods cause localized inundation along East Branch Coxes Creek.

2.4 Flood Protection Measures

Channelization of East Branch Coxes Creek on the east side of the Borough of Somerset was completed in 1985.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates.

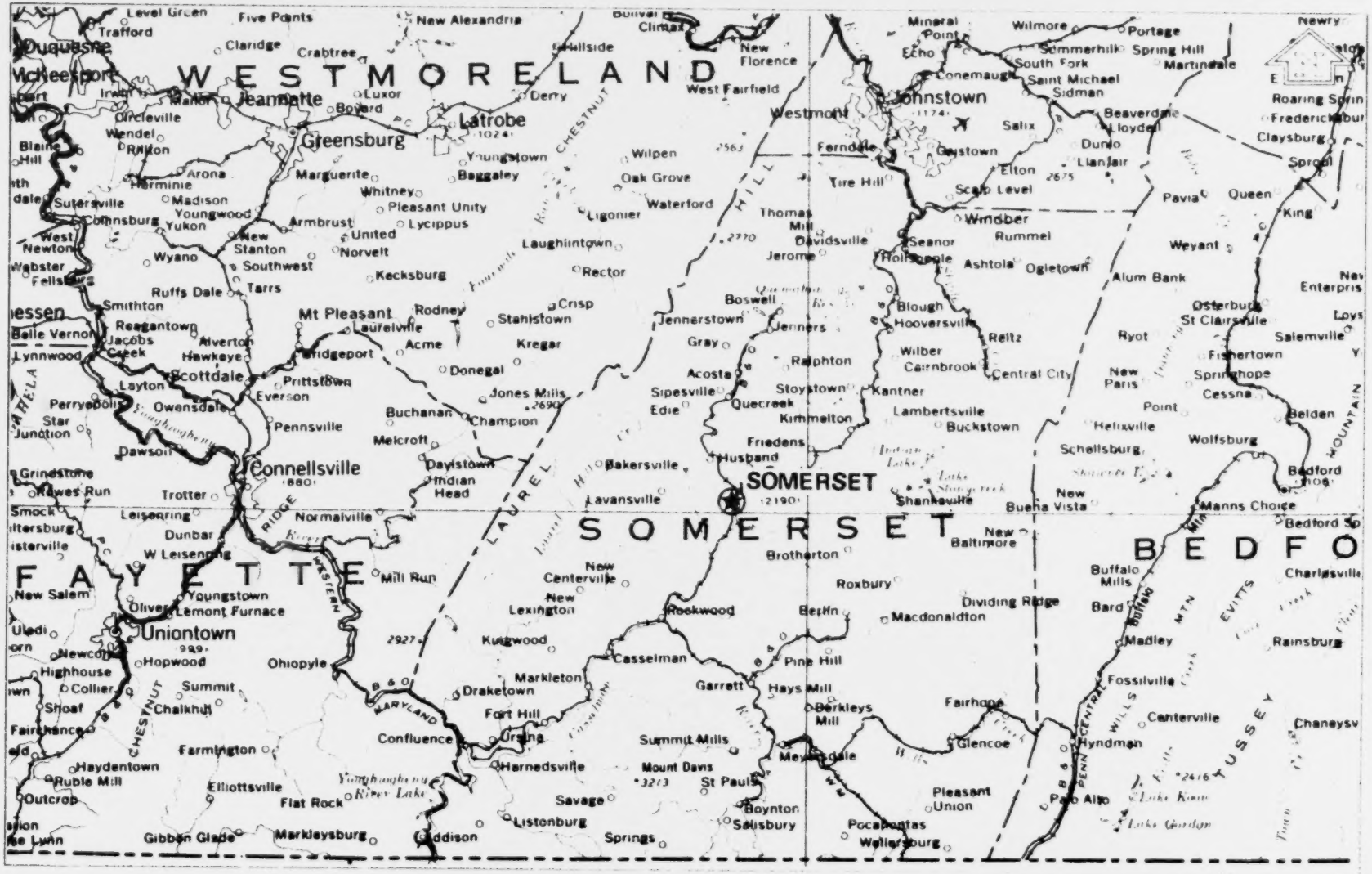


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF SOMERSET, PA

(SOMERSET CO.)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The flood-frequency discharge values for East Branch Coxes Creek, Unnamed Tributary to East Branch Coxes Creek, and Parson Run were taken from the Flood Insurance Study for the Borough of Somerset (Reference 1). The values for that study were determined from regionalized flood characteristics.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
EAST BRANCH COXES CREEK		
At South Center Avenue, below Kimberly Run	24.0	6,900
Above Kimberly Run	13.7	4,530
At South Center Avenue, above Parson Run	11.5	3,950
Below confluence of Unnamed Tributary to East Branch Coxes Creek	7.84	2,950
Above confluence of Unnamed Tributary to East Branch Coxes Creek	4.29	1,400
UNNAMED TRIBUTARY TO EAST BRANCH COXES CREEK		
At confluence with East Branch Coxes Creek	3.54	1,550
PARSON RUN		
At confluence with East Branch Coxes Creek	1.02	600

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections were field surveyed and located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures. All bridges, dams, and culverts in the community were field surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals for East Branch Coxes Creek, from a point approximately 9,750 feet upstream of the corporate limits to the CSX Transportation span below Parson Run, and from the Interstate Routes 70 and 76 bridge to the tailwater of the dam at Lake Somerset were computed by modeling channel and bridge hydraulics with the USGS WSPRO step-backwater computer program (References 2 and 3). A normal depth, based upon open-channel step-backwater analyses, was used to determine the starting water-surface elevation.

For the remaining portions of East Branch Coxes Creek, Unnamed Tributary to East Branch Coxes Creek, and Parson Run, water-surface elevations for floods of the selected recurrence interval were determined by downward adjustment of elevations presented in the Flood Insurance Study for the Borough of Somerset (Reference 1). These adjustments, which were 0.8 foot for the portion below Stoystown Road and 0.4 foot for the portion above Stoystown Road, approximate the effects of improved channel conveyance created by the channelization project of 1985. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of engineering judgment and field inspection of the floodplain areas. The channel "n" values for the streams studied by detailed methods ranged from 0.031 to 0.035, and the overbank "n" values ranged from 0.026 to 0.200.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 4).

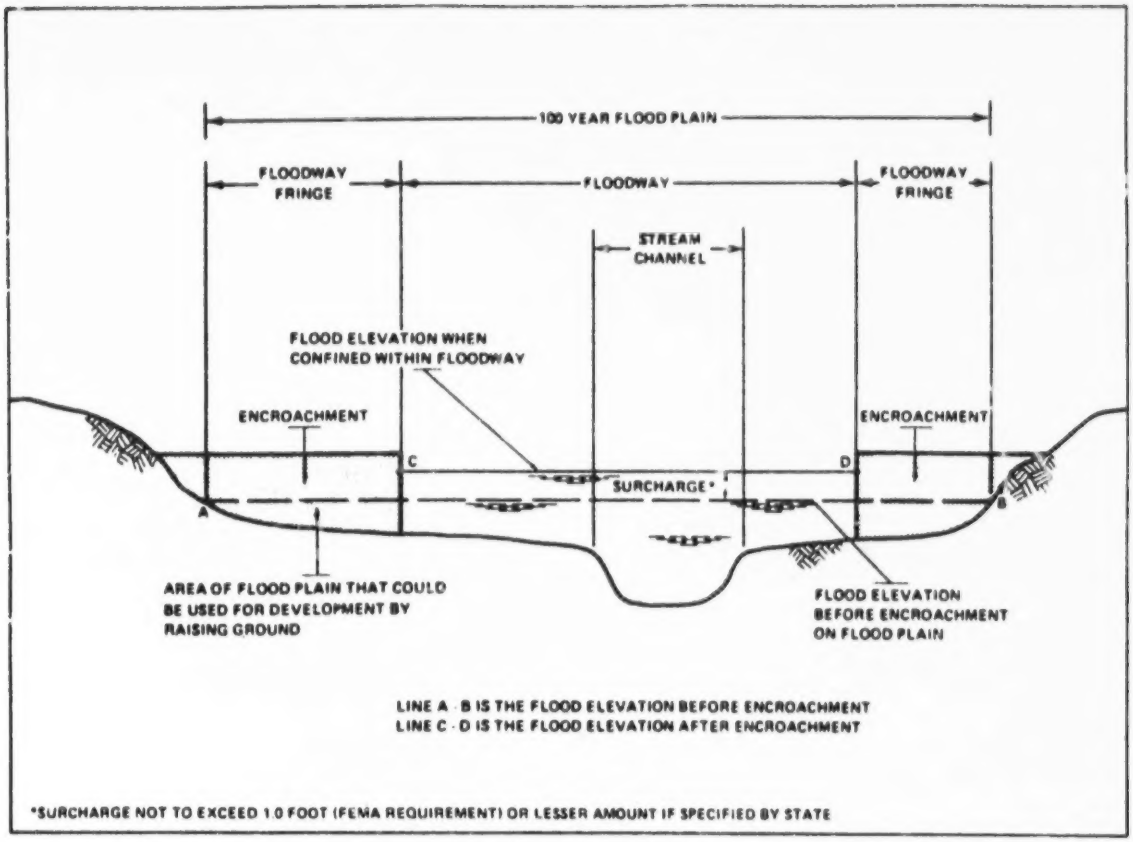
For the streams studied by approximate methods, the 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Map for the Township of Somerset (Reference 5).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths

Zone X (continued)

are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Borough of Somerset (Reference 1). Due to the more recent analysis used in this study, which included hydraulic adjustments to model the effects of the channelization project of 1985, the results of this study are not in exact agreement with the results of that study.

A Flood Insurance Study has been prepared for the Township of Quemahoning (Reference 6). The results of this study are in exact agreement with the results of that study.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the Township of Somerset (Reference 5).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Borough of Somerset, Somerset County, Pennsylvania, Washington, D. C., November 29, 1976.

2. U. S. Federal Highway Administration, Report FHWA/RD-86/108, Bridge Waterways Analysis Model/Research Report by J. O. Shearman, W. H. Kirby, V. R. Schneider, and H. N. Flippo, Jr., Washington, D. C., 1986.

3. National Technical Information Service, Bridge Waterways Analysis Model/User's Instructions by J. O. Shearman, W. H. Kirby, and V. R. Schneider, Springfield, Virginia, 1985.

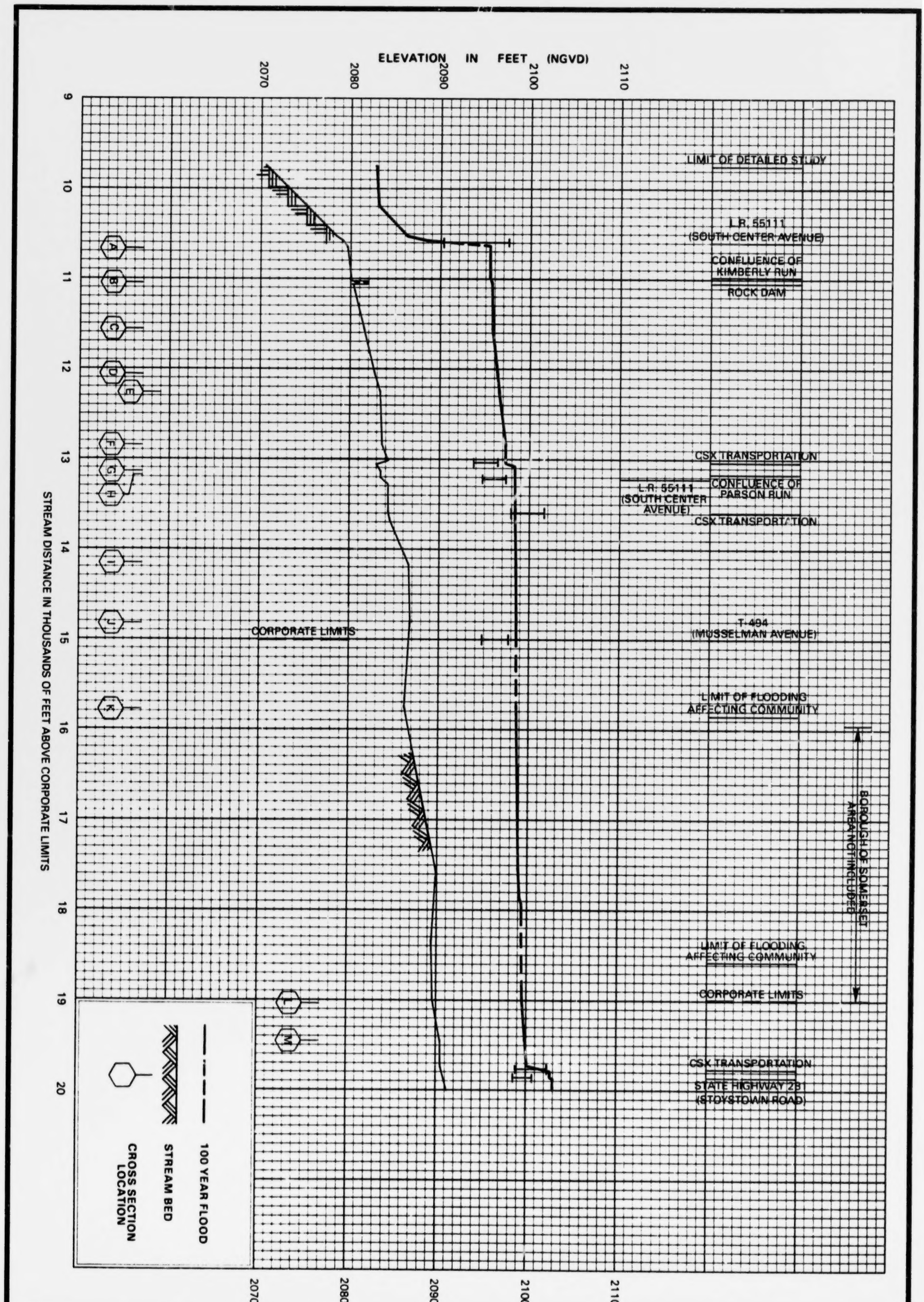
4. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Murdock, Pennsylvania, 1965, Photorevised 1981; and Somerset, Pennsylvania, 1967, Photorevised 1973.

5. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Township of Somerset, Somerset County, Pennsylvania, September 26, 1980.

6. Federal Emergency Management Agency, Flood Insurance Study, Township of Quemahoning, Somerset County, Pennsylvania, Washington, D. C., August 15, 1989.

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	15	2,099.63	Monel rivet in southwest corner of CSX Transportation bridge over East Branch Coxes Creek near Stoystown Road.
RM 2	15	3,105.68	USC&GS disk set vertically in east wall of abandoned B & O Railroad station, approximately 44 yards southwest of intersection of East Patriot Street and South Pleasant Avenue in the Borough of Somerset.
RM 3	15	2,082.50	Top of steel bolt on top of west end of south headwall of CSX Transportation bridge No. 202 over East Branch Coxes Creek.



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF SOMERSET, PA

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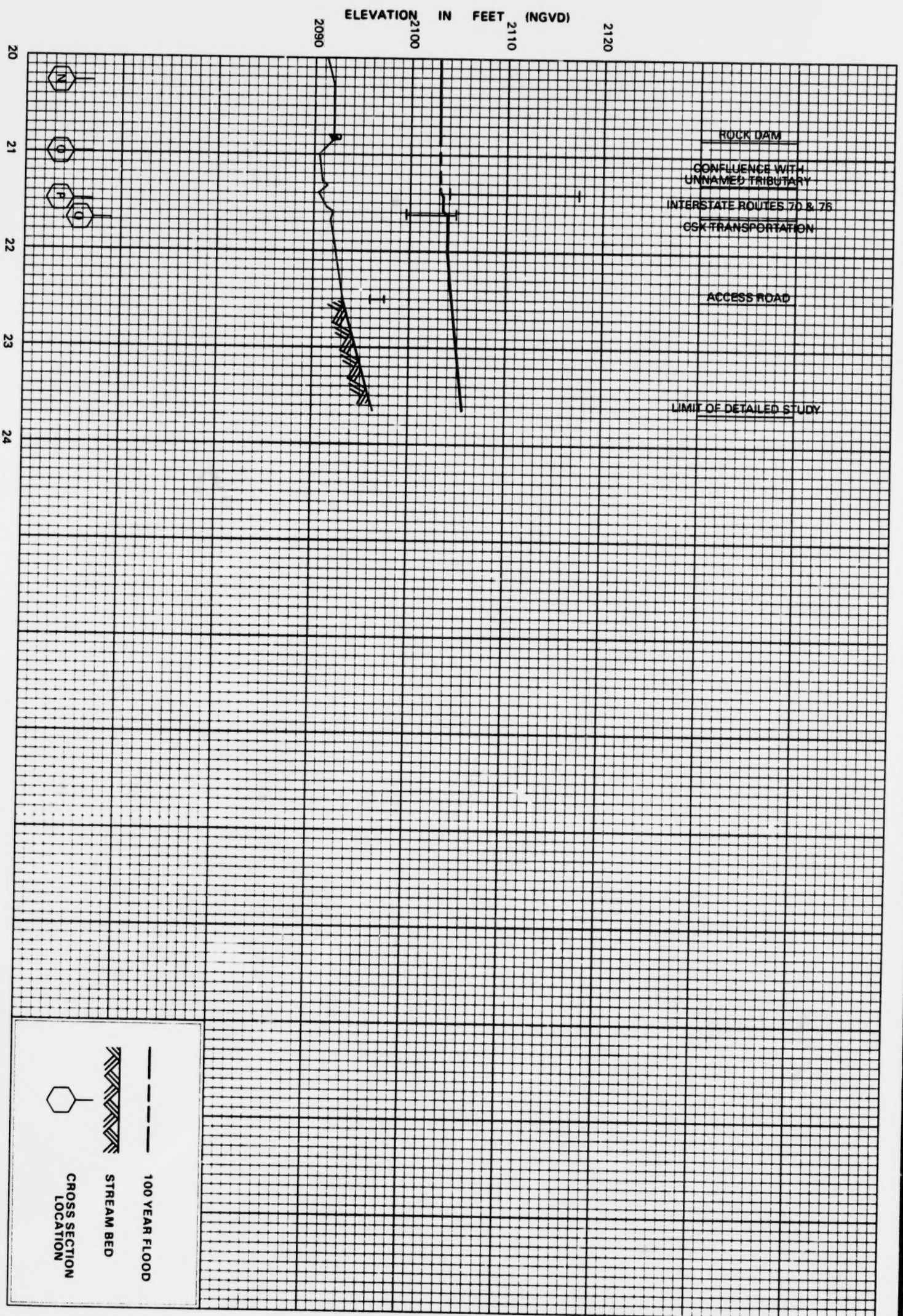
FLOOD PROFILES

EAST BRANCH COXES CREEK

01P



FEDERAL EMERGENCY MANAGEMENT AGENCY

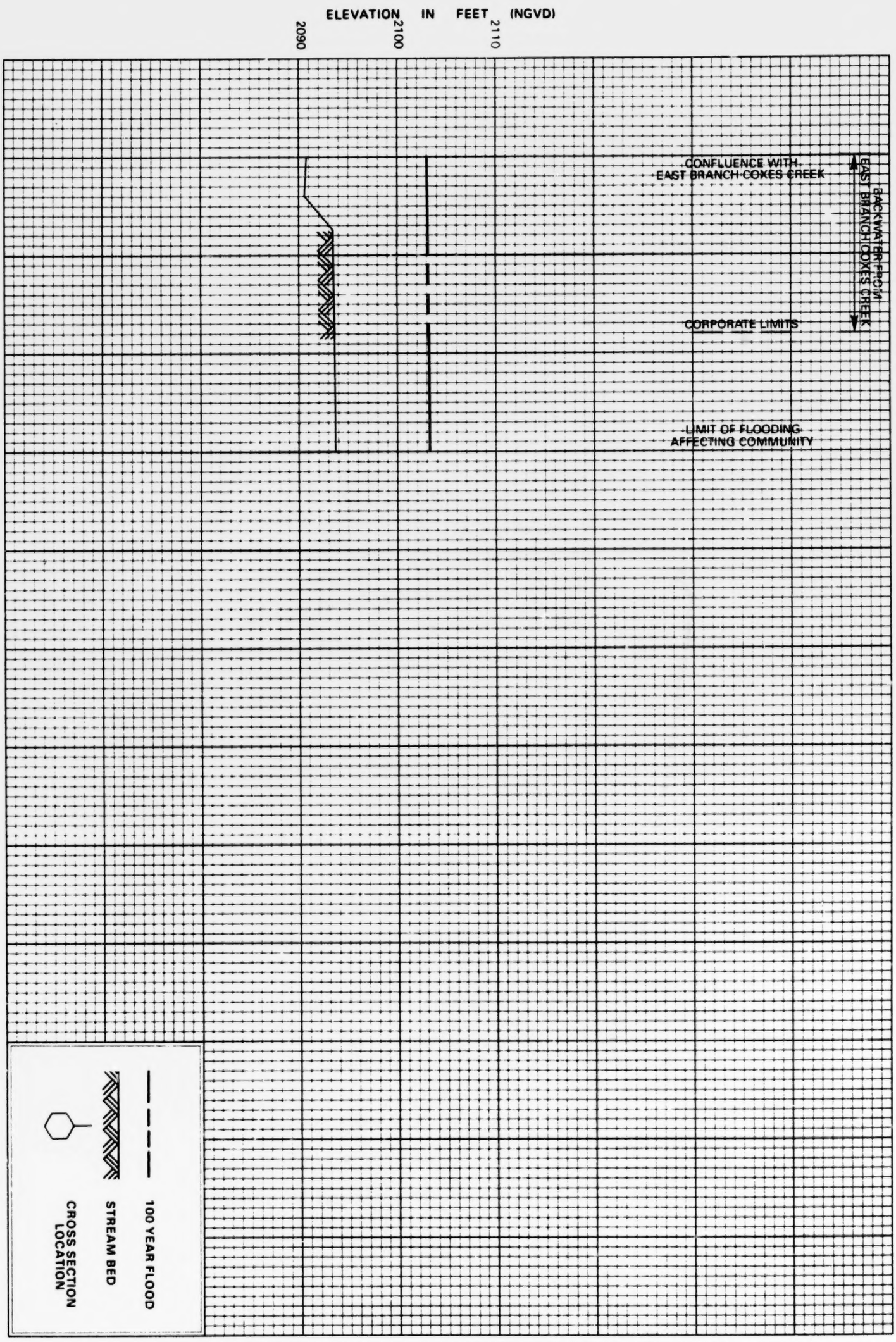
TOWNSHIP OF SOMERSET, PA

(SOMERSET CO.)

02P

FLOOD PROFILES

EAST BRANCH COXES CREEK



03P

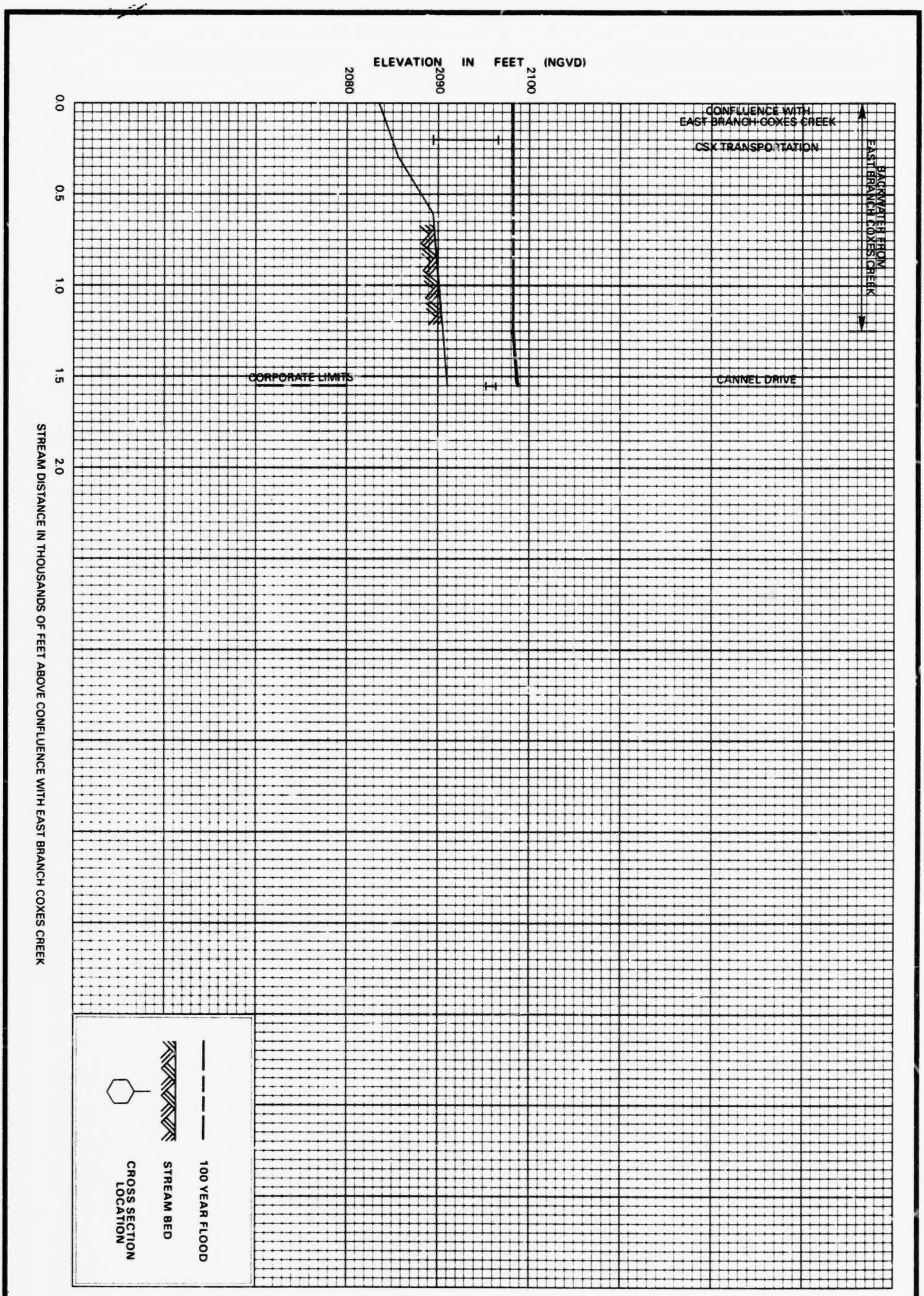
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF SOMERSET, PA

(SOMERSET CO.)

FLOOD PROFILES

UNNAMED TRIBUTARY TO EAST BRANCH COXES CREEK



FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF SOMERSET, PA

(SOMERSET CO.)

FLOOD PROFILES

PARSON RUN

04P